REMARKS/ARGUMENTS

Claims 1-48 are pending in the present application. Claims 1-8 and 25-48 have been withdrawn.

This Amendment is in response to the Office Action mailed March 20, 2009. In the Office Action, the Examiner rejected claims 9, 10, 12, 13, 15, and 16 under 35 U.S.C. §102(e); and claims 11, 14, and 17-24 under 35 U.S.C. §103(a). Reconsideration in light of the remarks made herein is respectfully requested.

Rejection Under 35 U.S.C. § 102

In the Office Action, the Examiner rejected claims 9, 10, 12, 13, 15, and 16 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,933,597 issued to Poddar et al. ("Poddar"). Applicant respectfully traverses the rejection and submits that the Examiner has not met the burden of establishing a *prima facie* case of anticipation.

Poddar discloses a spacer with passive components for use in multi-chip modules. Bond wires 21 couple each active die 12/14 to the lead frame 18 as well as couple each active die to spacer 16 (Poddar, col. 3, lines 33-37; Figure 4). Passive components such as resistors, capacitors and inductors being fabricated on or within a non-conductive spacer 16 (Poddar, Abstract). In figure 2, spacer 16 is electrically coupled to active die 12 via solder bumps 22 formed on the lower surface of the spacer. A solder melting operation would create the connection with the active die 12 (Poddar, col. 3, lines 1-6, Figure 2). In figure 3, solder bumps 21 are formed on the lower surface of the active die 14 (Poddar, col. 3, lines 7-9; Figure 3).

Poddar does not disclose, either expressly or inherently, at least one of: (1) a spacer between upper and lower dies in stacked dies on a package substrate to provide clearance for bond wires attaching to bond pads on the lower die; (2) a thin-film passive element integrated on the spacer; (3) an adhesive layer assembly to attach the spacer and the thin-film passive element to the upper and lower dies; and (4) conductors attached to the passive element and the adhesive layer assembly to connect the passive element to at least one of the upper and lower dies, as recited in independent claims 9 and 17.

Poddar merely discloses bond wires 21 couple each active die 12/14 to the lead frame 18 as well as coupling each active die to spacer 16 (Poddar, col. 3, lines 33-37; Figure 4), not bond

wires attaching to bond pads on the lower die, as recited in claims 9 and 17. As shown in Figure 1 and 4, there is no teaching or suggestion of the active die 12, allegedly the lower die, having bond pads. Accordingly, the bond wires 21 cannot be "attaching to bond pads on the lower die," as alleged by the Examiner.

Additionally, Poddar merely discloses passive components such as resistors, capacitors and inductors being fabricated on or within a non-conductive spacer (Poddar, Abstract), not a thin-film passive element integrated on the spacer, as recited in claims 9 and 17. The Examiner alleges that the passive components in Poddar correspond to "thin film elements" because the components in Poddar are "thin enough to be embedded in a spacer" (Office Action, page 2). Applicant respectfully disagrees and submits that a thin film element such as a thin film capacitor, inductor, or resistor 230 (Specification, par. [0019]) are not merely passive elements that are thin enough to be embedded in a spacer. Instead, taking the inductor for example, ECN Asia Magazine in "A comparison of thin-film and wire-wound inductors" states:

> "The performance of a simple wire-wound inductor is affected by the resistance of the wire used in the winding as well as the distributed parasitic capacitance along the length of the adjacent coiled wires. Prior to the emergence of thin-film inductors and commercially wound SMT inductors, RF engineers had to wind their own coils on forms to create inductors needed for their designs. Those engineers would constantly battle the desire to make small, light coils by using tightly wound, small AWG wire at the risk of hurting inductor performance…
>
> Thin-film technology is commonly used in producing semiconductor devices. In the last few decades, this technology has evolved tremendously in performance, process control and cost.
>
> Compared to wire-wound inductors, thin-film inductors are physically easier to pick, place and process.
>
> Thin film technology allows for the deposition of low ESR line width structures to the micron and below level. The result of such small structures yields extremely tight tolerance inductors in virtually any value imaginable." (See ECNAsiaMag.com, "A comparison of thin-film and wire-wound inductors," 01

Nov 2006: http://www.ecnasiamag.com/article-11261-acomparisonofthinfilmandwirewoundinductors-Asia.html, for further details).

Thus, since Poddar merely discloses passive components being embedded in the spacer 16 and does not teach or suggest "thin film passive elements", Poddar fails to teach this element of the claims.

Furthermore, in figure 2, Poddar illustrates how spacer 16 is electrically coupled to active die 12 via solder bumps 22 formed on the lower surface of the spacer. A solder melting operation would create the connection with the active die 12 (Poddar, col. 3, lines 1-6, Figure 2). Similarly, in figure 3, solder bumps 21 are formed on the lower surface of the active die 14 (Poddar, col. 3, lines 7-9; Figure 3). The solder bumps 22 cannot correspond to "an adhesive layer assembly to attach the spacer and the thin-film passive element to the upper and lower dies," as recited in claims 9 and 17. First, as discussed above, Poddar fails to teach the "thin-film passive element." Second, the solder bumps cannot be an adhesive layer assembly given that a solder ball is spherical in shape to reduce surface oxidation. In contrast, the adhesive layer 250 is "a layer filled with adhesive material that is electrically and thermally conductive" (See Specification, par. [0018] for further details). Accordingly, a solder ball cannot be an adhesive layer such that Poddar fails to teach this element of the claims.

Regarding figure 4, Poddar merely discloses bond wires 21 coupling each active die 12/14 to the lead frame 18 (Poddar, col. 3, lines 34-36; Figure 4). Bond wires 21 are merely wires providing electrical connections (Poddar, col. 3, lines 36-38). The bond wires 21 do not form a layer, let alone, adhesive layer assembly to attach the spacer and the thin-film passive element to the upper and lower dies, as recited in claims 9 and 17.

Moreover, Poddar merely discloses that the completed multi-chip module would include a molded or cast body, made from any number of suitable materials including ceramics and plastics (Poddar, col. 2, lines 56-60). The Examiner alleges that the plastic mold package body corresponds to the adhesive layer assembly (Office Action, page 2). Applicant respectfully disagrees and submits that plastic mold package body is merely a package body for the multi-chip module (Poddar, col. 2, lines 60-62). Since the package body merely surrounds the completed multi-chip module, there is no teaching that the package body is not between the

spacer and the thin-film package element and the upper and lower dies, as illustrated in Figures 1 and 2. Accordingly, Poddar fails to teach "an adhesive layer assembly to attach the spacer and the thin-film passive element to the upper and lower dies," as recited in claims 9 and 17.

Further, since Poddar fails to teach, *inter alia*, the adhesive layer assembly, Poddar cannot teach "conductors attached to the passive element and the adhesive layer assembly to connect the passive element to at least one of the upper and lower dies," as recited in claims 9 and 17.

To anticipate a claim, the reference must teach every element of a claim. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Vergegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the...claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ 2d 1913, 1920 (Fed. Cir. 1989). Since the Examiner failed to show that Poddar teaches or discloses any one of the above elements, the rejection under 35 U.S.C. §102 is improper.

Therefore, Applicant believes that independent claims 9 and 17 and their respective dependent claims are distinguishable over the cited prior art references. Accordingly, Applicant respectfully requests the rejection under 35 U.S.C. §102(e) be withdrawn.

Rejection Under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 11, 14, 17-24 under 35 U.S.C. §103(a) as being unpatentable over Poddar. Applicant respectfully traverses the rejection and submits that the Examiner has not met the burden of establishing a prima facie case of obviousness.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *MPEP §2143, p. 2100-126 to 2100-130 (8th Ed., Rev. 5, August 2006).* Applicant

respectfully submits that there is no suggestion or motivation to combine their teachings, and thus no *prima facie* case of obviousness has been established.

Furthermore, the Supreme Court in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966), stated: "Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined." MPEP 2141. In *KSR International Co. vs. Teleflex, Inc.*, 127 S.Ct. 1727 (2007) (Kennedy, J.), the Court explained that "[o]ften, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." The Court further required that an explicit analysis for this reason must be made. "[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR 127 S.Ct.* at 1741, quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). In the instant case, Applicant respectfully submits that there are significant differences between the cited references and the claimed invention and there is no apparent reason to combine the known elements in the manner as claimed, and thus no *prima facie* case of obviousness has been established.

Poddar discloses a spacer with passive components for use in multi-chip modules as discussed above.

Poddar, taken alone or in any combination, do not disclose or render obvious, at least one of: (1)-(4), as recited in independent claims 9 and 17; (5) the thin-film passive element is placed between the spacer and the lower adhesive layer, as recited in claims 11 and 19; and (6) the passive element is an inductor having an inductance of approximately between 1 nH to 10 nH, or a resistor having a resistance of approximately between 0.2 ohms to 2.0 ohms, as recited in claims 14 and 22.

As discussed above, Poddar does not disclose or render obvious elements (1)-(4) as above. Accordingly, a combination of Poddar with any other references in rejecting claims dependent thereon is improper.

Furthermore, Applicant submits that the Examiner's arguments regarding claims 11, 12, 19, and 22 are improper, as discussed below.

Regarding claim 11, the Examiner contends that "the placement on top embedded in or on the bottom of the spacer would not modify the operation of the device" (Office Action, page 4, paragraph 9). Applicant respectfully disagrees. If the thin-film passive element is placed between the spacer and the upper adhesive layer as suggested by the Examiner, it will not be contact with the conductor (See Figure 2 of Specification). Accordingly, it will not be able to provide the necessary electrical connection to the lower die and the package device would not function properly.

Regarding claims 14 and 22, the Examiner contend that "where the general working conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art" (Office Action, pages 4-5, paragraph 10). Applicant respectfully disagrees. As admitted by the Examiner, Poddar does not provide any operational ranges for the passive components. Accordingly, there cannot be an overlap or lie inside ranges or a range encompassing a somewhat narrowed claimed range, as required for a *prima facie* case of obviousness. MPEP § 2144.05. Thus, the Examiner failed to establish a *prima facie* case of obvious for the claimed ranges.

The Examiner failed to establish a *prima facie* case of obviousness and failed to show there is teaching, suggestion, or motivation to combine the references. When applying 35 U.S.C. 103, the following tenets of patent law must be adhered to: (A) The claimed invention must be considered as a whole; (B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination; (C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and (D) Reasonable expectation of success is the standard with which obviousness is determined. *Hodosh v. Block Drug Col, Inc.,* 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986). "When determining the patentability of a claimed invention which combined two known elements, 'the question is whether there is something in the prior art as a whole suggest the

desirability, and thus the obviousness, of making the combination.'" *In re Beattie*, 974 F.2d 1309, 1312 (Fed. Cir. 1992), 24 USPQ2d 1040; *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1462, 221 USPQ (BNA) 481, 488 (Fed. Cir. 1984). To defeat patentability based on obviousness, the suggestion to make the new product having the claimed characteristics must come from the prior art, not from the hindsight knowledge of the invention. *Interconnect Planning Corp. v. Feil*, 744 F.2d 1132, 1143, 227 USPQ (BNA) 543, 551 (Fed. Cir. 1985). To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the Examiner to show a motivation to combine the references that create the case of obviousness. In other words, the Examiner must show reasons that a skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the prior elements from the cited prior references for combination in the manner claimed. *In re Rouffet*, 149 F.3d 1350 (Fed. Cir. 1996), 47 USPQ 2d (BNA) 1453. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or implicitly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973. (Bd.Pat.App.&Inter. 1985). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Furthermore, although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so." *In re Mills*, 916 F.2d at 682, 16 USPQ2d at 1432; *In re Fritch*, 972 F.2d 1260 (Fed. Cir. 1992), 23 USPQ2d 1780.

Moreover, the Examiner failed to establish the factual inquires in the three-pronged test as required by the *Graham* factual inquires. There are significant differences between the cited references and the claimed invention as discussed above. Furthermore, the Examiner has not made an explicit analysis on the apparent reason to combine the known elements in the fashion in the claimed invention. Accordingly, there is no apparent reason to combine the teachings of Poddar in any combination.

In the present invention, the cited references do not expressly or implicitly disclose any of the above elements. In addition, the Examiner failed to present a convincing line of reasoning as to why a combination of Poddar with any other reference is an obvious application of integrating passive components on spacer in stacked dies, or an explicit analysis on the apparent reason to combine Poddar with any other reference in the manner as claimed.

Therefore, Applicant believes that independent claims 9 and 17 and their respective dependent claims are distinguishable over the cited prior art references. Accordingly, Applicant respectfully requests the rejection under 35 U.S.C. §103(a) be withdrawn.

Conclusion

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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